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worthy. The average transmission of the lunar rays by glass during the eclipse was about twenty-two per cent, and did not differ very materially from that for the un eclipsed moon on this day. If the increased transmissibility at the outer edge of the umbra be a real effect, it is possibly local and evanescent.

*The deflection obtained from a portion of the lunar surface just in advance of the umbra did not very materially differ from that given by a similar portion over which the umbra had just passed.*

Clouds, preventing further observations, began to form as the penumbra was about passing off. There were indications, however, of a recovery of heat nearly as rapid as the previous fall. This effect was shown, though in a less marked manner, by Dr. Boeddicker's observations, in the eclipse of Oct. 4, 1884, made at Lord Rosse's observatory (see *Nature*, xxx. p. 589).

The following are the deflections observed on each point during the progress of the eclipse at Allegheny :

	Deflec- tion.	Time.	Time from mid- eclipse.		Deflec- tion.	Time.	Time from mid- eclipse.		Deflec- tion.	Time.	Time from mid- eclipse.
East.	164	h. m.	h. m.	cen- tre.	180	h. m.	h. m.	West.	155	h. m.	h. m.
"	125	11.53	2.35	"	128	12.01	2.27	"	153	12.16	2.12
"	45	12.26	2.28	"	128	12.44	1.44	"	153	12.32	1.56
N.E.	4	12.53	1.35	"	101	1.06	1.22	"	129	12.58	1.30
S.E.	71	1.38	1.00	"	31	3.49	1.21	"	21	4.05	1.37
		3.43	1.15								

The salient feature of these observations is, we need hardly say, the extraordinary rapidity with which the lunar surface parts with its heat, most of that which is radiated disappearing all but simultaneously with that reflected. S. P. LANGLEY.

Allegheny observatory, Dec. 23.

### Sir William Thomson to the coefficients.

I know of no easier way to reach those for whom the enclosed message was especially intended than through the columns of *Science*. At the same time, I believe it will be read with great interest by many who were not of the somewhat limited number referred to. To such, a brief explanation may be due :—

At the close of the course of lectures by Sir William Thomson, at Baltimore, in October, 1884, it was determined by those who, through the courtesy of the Johns Hopkins university, had enjoyed the privilege of listening to the course, to present Sir William with a memento of the occasion which had been, to them, of such unusual interest. Under the circumstances, nothing could have been more fitting for this purpose than one of Professor Rowland's large concave gratings, which was accordingly agreed upon. Several months were required for the manufacture and examination of a grating which was entirely satisfactory to Professor Rowland; but early in the past summer it was completed, and transmitted to Sir William Thomson through the kindness of the secretary of the Smithsonian institution.

Prof. George Forbes of London was present during the course of lectures, and Lord Rayleigh attended a number of them. In the equations of motion developed in the work there appeared twenty-one coefficients, agreeing in number nearly, if not exactly, with the number of persons in regular attendance

upon the lectures. This relation was quickly noticed by some one, and was made the basis of some humorous verses composed by the genial and witty Forbes, which were read at a reception given to the class by President Gilman, and were afterward published. Their title was "The lament of the twenty-one coefficients in parting from each other and from their much-esteemed molecule."

The first stanza began,—

"An aeolotropic molecule was looking at the view.  
Surrounded by his coefficients, twenty one or two;,"

and the whole will always possess much interest to those who were present. With this explanation, I justify the title which I have given to the following selections from a letter recently received from Sir William Thomson. T. C. M.

Washington, D.C., Dec. 28.

I wrote to Professor Rowland, acknowledging the receipt of the grating; but I ought before now to have thanked all the other coefficients for their kindness in giving it to me. I should feel greatly obliged if you would transmit to those of the coefficients who are in America my heartiest thanks for their great kindness, and say to them that the grating will be a permanent memorial to me of the happy three weeks of 1884, when we were together in Baltimore. . . . After the British association meeting at Aberdeen, I was delighted to be able to show the grating to some of our English appreciators,—including one of the coefficients, George Forbes; and Lord Rayleigh, whom we may consider as, at all events, a partial coefficient; and Professor Fitzgerald of Trinity college, Dublin; Oliver Lodge of Liverpool; Glazebrooke of Cambridge; and Captain Creak of the compass department of our admiralty,—who came to stay with us at Netherhall, our country house, for a few days, on their way south. We had no sunlight to work with, but we got the double sodium light in the first and second spectrums from a salted spirit-lamp flame exceedingly well, and we were all delighted with the result. I had never myself seen any thing like it before. WILLIAM THOMSON.

The university, Glasgow, Dec. 5.

### A waste of public money.

My attention has just been drawn to your notice in *Science* of Dec. 4, of my forthcoming report on irrigation. The substance of your criticism is that quantity, and not quality, appears to have been the object in its compilation,—that the work should have been written in one volume instead of three; and you quote a long, redundant paragraph as a sample of the composition throughout.

It is to be regretted that you undertook to criticise an entire report, when you had before you only some advance sheets of one volume, very hastily printed from unrevised manuscript, solely for the purpose of an exhibit to the legislature, which desired to know something of the scope of the work.

The entire report, as ordered printed, is now under way; and I believe you will find, when you receive a copy, a decided improvement in the literary construction which you have criticised. As for the general make-up of the work,—its fulness, and occasional repetition of matter under different headings,—which you do not specially refer to, but probably have noticed, I shall have something to say at the

proper time and place. In the mean while, the many kindly, encouraging, and sometimes flattering words of approval which I have received from persons who have read the 'advance sheets' you criticise, and whom I believe to be specially qualified to judge of a work on this subject, will sustain me in the labor of completing it as begun.

You have criticised a work projected on one plan, and to fill a demand amongst irrigators and persons, from one cause or another, interested in the details of the subject, as though it purported to be on another plan, and for general circulation and sale. When the first volume is published, I hope to make this clear to you. It has always been the intention to bring the more important matter of general interest in this report within the compass of one moderately sized volume, to meet the demand of which you speak. This was the subject of a recommendation to the legislature, in my biennial report transmitted with the advance sheets of the final report; and I am glad to tell you that there will be submitted to the legislature at its next session (January, 1887) a concise and readable report for general circulation, in addition to the more voluminous books of reference.

WM. HAM. HALL,

*State engineer, California.*

Sacramento, Cal., Dec. 22.

### The Davenport tablet.

As the evidence in regard to the limestone tablet indicates that it was a plant made to deceive the members of the Davenport academy, we are led to inquire whether the authenticity of the shale tablets rests on any better foundation. Accepting the statements in regard to their discovery as published in the Proceedings, and referring to the excellent albertypes on plates 1, 2, and 3, vol. ii., we notice the following facts calculated to arouse suspicion:—

On the so-called 'cremation scene,' plate 1, vol. ii., are three Arabic 8's, one so much like that on the limestone tablet as almost to lead to the belief that the two were made by one hand. Moreover, there are, as admitted by the finder (vol. ii. p. 223), four other characters on the latter identical with characters in the 'cremation scene.' This links the two so closely together as to induce the belief that they belong in the same category, and hence that the conclusion reached in regard to the limestone tablet must apply to all the shale tablets, as the latter were found together in the mound known as No. 3 of the 'Cook farm group.' It is also stated in the Proceedings (vol. ii. p. 223), that the bird-figures on the limestone tablet "have each a bit of quartz crystal set in for an eye, like the eyes of the animal figure from mound No. 3, . . . and, like those, they are held in place by a white cement of some kind." This animal figure was found in the dirt thrown out of mound No. 3, from which the shale tablets were obtained (vol. ii. p. 256). It is therefore almost impossible to avoid the conclusion that all must stand or fall together.

No. 3 appears to have been a double mound, the southern portion only having been explored in 1874; the northern part (in which the shale tablets were found), not until 1877. According to Dr. Farquharson (vol. i. p. 119), the part first opened contained no layers of shells or stones; and no mention is made of an excavation or grave in the earth beneath, nor does the figure (No. 3, plate 2, vol. i.) show any stratifica-

tion or grave. Turning to the figure of the same mound (vol. ii. p. 92), we find both strata and grave represented in this southern portion. Mr. Gass, in his subsequent account (vol. ii. p. 92), says some errors were made in the first description and illustrations; but Dr. Farquharson says his description was made from Mr. Gass's statements, and partly from personal observation on the spot (vol. i. p. 118). Attention is also called to the fact that the skeletons of the intrusive burial over the southern grave, as well as the three in it, were whole and undisturbed; while over the northern grave the human bones of the intrusive burial were scattered through the soil, and with them the fragments of a brass ring; while in it, beneath the shell stratum, were "fragments of human bones and small pieces of coal slate or bituminous shale" (Mr. Gass's account, Proceedings, vol. ii. pp. 95, 96). In the plan of the mound (fig. 9, vol. ii. p. 93), a single skull is represented in this northern grave where the tablets were discovered. This condition of the contents is scarcely consistent with the idea that there had been no previous disturbance of this part of the mound.

The tablets were not discovered until five o'clock in the afternoon (Jan. 10), "*covered on both sides with clay, on removal of which the markings were for the first time discovered*" (vol. ii. p. 96), yet we are informed which side of each was upward as they lay in their resting-place.

It may not be out of place to call attention to the fact that nearly all of the letter characters of the 'cremation scene,' as represented on the albertype, may be found on p. 1766 of Webster's unabridged dictionary, edition of 1872, or any subsequent edition, where the letters of the ancient alphabets of the old world are figured. A few, it is true, are reversed, and in some instances the form is slightly varied; but the resemblance in most cases is very strong. The reader can make the comparison for himself; but I would call his attention to the fact that in the upper of the two transverse curved lines, near the right-hand end, the two forms of the 'Gallic' *O* appear together, just as given on the page of the dictionary. He will also observe that in some instances a number of characters in close relation on the tablet are found near together on the page of the dictionary; here, also, we find the 8 so often used on the tablets. A photograph or the albertype must be used for this comparison.

It is true, letters of almost any form can be found on this page, but it would be an anomaly to find a brief ancient inscription consisting of letters from half a dozen alphabets of widely different ages, and partly of the angular and partly of the cursive types. That this is true of this inscription, is readily seen by the suggested comparison. Dr. Seyfforth, in his attempt at an explanation, published in vol. iii. of the Proceedings, was forced to go to half a dozen or more alphabets to find the letters given in this single short inscription.

The tablet represented in plate 3, vol. ii., and known as the 'calendar stone,' indicates, beyond any reasonable doubt, contact with people acquainted with the twelve signs of the zodiac. This is admitted by Dr. Farquharson (vol. ii. p. 109) and Dr. Seyfforth (vol. iii. p. 77), and necessarily forces us to the conclusion that it is post-Columbian, or the result of contact, possibly at some very ancient date, with people of the eastern hemisphere.

The fact that the diameter of the inner circle is